

Notice of Allowability

Application No.

10/089,357

Examiner

Jaworski Francis J.

Applicant(s)

SCHWEIKARD ET AL.

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to RCE Req., IDS 6/21/06.
2. ☒ The allowed claim(s) is/are 1 - 13.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

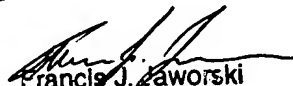
Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 6/21/06
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date _____.
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.


Francis J. Jaworski
Primary Examiner

EXAMINER'S AMENDMENT AND REASONS FOR ALLOWANCE

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with J. William Frank III on July 27, 2006-07-27

The application has been amended as follows: In Claim 9 line 2 before "surgical" "the" has been changed to -- a--.

The following is an examiner's statement of reasons for allowance:

Klotz et al (US5852646, of record in the IDS filed June 21, 2006 with the RCE submission) is directed to the superposition of synthetic images formed from three-dimensional X-ray data acquisition with two-dimensional images from the same viewpoint perspective, where the synthetic images may be segmented or have simple boundary outlines produced as lines or contours/surfaces (? - presumed for the language 'simple geometrical bodies', see col. 5 lines 30 – 42).

Klotz et al (US5978439, made of record herewith by the Examiner) is further directed to the determination of a subvoxel region for example for such vascular imaging with projection of the subvoxel region onto the aforementioned synthetic image.

The Klotz et al patents do not teach a method for navigating in the body interior, do not address the modeling of bone save for relation to intracranial or other tumor viewing, do not form any constituent conical surface in accordance with a conical directrix based upon a geometric structure in the body and the image system spatial location and therefore cannot attempt to form a determination of geometric structure from an intersection of such conical surfaces nor do they form such a determination of geometric structure in any other fashion from the synthetic and two dimensional X-ray views or their superposition, and they focus instead on vascular imaging with background subtraction, for which the formation of a conical surface in accordance with a conical directrix would be impractical in view of vessel tortuosity and mesh pattern. Most importantly, Klotz et al is interested in stereoscopic viewing of adjacent 2D images with angular perspective change for binocular effect and not in order to re-construct geometric body structure from an intersection of such surfaces.

Schlumberger et al (US4899318, of record in the IDS filed July 22, 2002) was directed to reconstruction of an object from two or more backprojection images using a volume determination of all rays which pass through the object and then determining the envelope limit of this volume using distances and determined first and second spaces inside of and outside of the object envelope, without suggestion to streamline this process using a conical surface projection based upon the shape of the reconstructed object. In effect Schlumberger et al is a computationally inefficient approach to object reconstruction and would not have been enhanced by the Klotz et al patents.

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German Offenlegungsschrift DE 198 07 884 A1, of record with the aforementioned IDS, is directed towards instrument trajectorizing in relation to bone using planar buildup of a tomographic volume reconstruction.

Walterman (US6061469) is directed to simulated X-ray reconstruction using decomposition of the synthetically viewed solid into nested shells.

Yang (US6944259) is directed to cone beam source illumination together with computationally simplified moving frame reconstruction for three-dimensional image reconstruction.

Lampman et al (US5532595) is directed to magnetic resonance imaging using sinusoidal field gradients such that reduced volume (spherical/ellipsoidal/cylindrical) scan regions can be obtained.

Schomberg (US6542573) is directed to reconstructing 3D images from cone beam projection - as opposed to conical surface involvement with backprojection – with determination of pseudo-projection data in an outer rim beyond the sensitive detector surface.

Klotz et al (US6618468) compensates for cone beam cutoff by acquiring projection data in different modes for different examination subzones unrelated to investigated object geometry.

Corby (US5274551) performs fluoroscopic navigation by back-projecting a catheter line contour into a three-dimensional vascular model.

Kuo-Petravic et al (US5375156) used Feldkamp backprojection methods for cone beam 3-D X-ray projection across orthogonal great circles to improve resolution for backprojection reconstruction of an object.

Mori et al (US5475422) proposed three-dimensional reconstruction from plural camera view fields by selecting feature points in a field of view to form a backprojection line which is then projected onto additional images to form epipolar reference backprojection lines for the reconstruction.

Tuy (US5625660) is directed to image reconstruction from cone beam projection data obtained along a spiral helical scan path with a severality of projection views by processing data in rows tangent to the cone vertex in different (untruncated) fashion with respect to detector data orthogonally oriented with respect to the cone vertex.

Heuscher (US4305127) is directed to small scan circle region of interest back-propagation based upon slope and attenuation values at the edge of the truncated projection region.

None of the prior art alone or in combination teaches or suggests inter alia generating a conical surface in space for every contributing projection image with the cone vertex and directrix for the surface determined by the spatial position of the imaging system and the shape of the directrix determined by the object being visualized or by a defined projection of the object surface, forming the spatial intersection of the conical surfaces to determine a geometric structure, and displaying the representation of structure so derived and using same for navigation, or in conjunction with


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magnetoressonance imaging with specific application using the spongiosa of bone as the geometric structure with reference to which navigation the representation is being used.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jaworski Francis J. whose telephone number is 571-272-4738. The examiner can normally be reached on 8:30 - 5:00 Mon - Fri..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eleni Mantis-Mercader can be reached on 571-272-4740. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.


Francis J. Jaworski
Primary Examiner
1-21-06